

## **ABSTRACT**

This invention provides a thermal-assisted switching magnetic memory storage device. In a particular embodiment, a cross-point array of conductive rows and columns is provided with offset tunnel junction magnetic memory cells provided proximate to the intersections between the rows and columns. A looping write conductor is provided close to, but not in electrical contact with each memory cell. The looping write conductor loops across the top and bottom of each memory cell. Each magnetic memory cell provides a magnetic data layer characterized by a material wherein the coercivity is decreased upon an increase in temperature, an intermediate layer, and a reference layer. The magnetic fields provided by the looping write conductor during a write operation are not sufficient to alter the magnetic orientation of an unheated data layer, but may alter the data layer of a memory cell warmed by a bias current tunneling through the memory cell.